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with iron pyrites and organic calcium carbonate, as to leave no doubt¹ that they have been produced by the action of these two substances upon each other.—Messrs. Clark and Catlett² have discovered small quantities of platinum in a mass of sulphide of nickel, iron and copper from the copper mines at Sudbury, Ontario. The principal sulphide in the mass is the rare mineral *polydymite* $(\text{NiFe})\text{S}_6$.—Mallard³ has measured the index of refraction for yellow light in the rare mineral *sellaite* from the vicinity of Montiers, and finds $\epsilon = 1.389$ and $\omega = 1.379$.—Cruciform twins of *thenardite* from Borax Lake, Cal., are stated by Mr. Ayres⁴ to have $P\infty$ as their twinning plane.—Jannash and Calb⁵ have analyzed a large number of specimens of tourmaline, and have reached the same conclusion with reference to the composition of the mineral as was reached by Riggs⁶ about a year ago.

PSYCHOLOGY.

THE SENSE OF SMELL IN DOGS.—Under this title Dr. George J. Romanes read a paper at the meeting of the Lumen Society of London, December 16, 1886. After preliminary observations on the faculties of special sense generally, and in particular that of smell, as enormously developed in Carnivora and Ruminantia, the author related his own experiments with a setter bitch. His conclusions are that in the case of this animal she distinguished his trail from that of all others by the peculiar smell of his boots, and not by the peculiar smell of his feet. "No doubt the smell which she recognized as belonging distinctively to my trail, was communicated to my boots by the exudations of my feet; but these exudations required to be combined with shoe leather before they were recognized by her. Moreover, it may be inferred that if I had always been accustomed to hunt without boots or stockings she would have learned to associate with me a trail made by my bare feet. The experiments further show that although a few square millimetres of the surface of

¹ Bull. d. l. Soc. Franc. O. Min., xi., p. 295.

² Amer. Jour. Sci., May, 1889, p. 372.

³ Bull. Soc. Franc. d. Min., xl., p. 302.

⁴ Amer. Jour. Science, March, 1889, p. 235.

⁵ Ber. d. deutsch. Chem. Ges., 1889, p. 216.

AMERICAN NATURALIST, 1888, p. 250.

one boot is amply sufficient to make a trail which the animal can recognize as mine, the scent is not able to penetrate a single layer of brown paper. Furthermore, it would appear that in following a trail this bitch is ready at any moment to be guided by inference as well as by perception, and that the act of inference is instantaneous. Lastly, the experiments show that not only the feet (as these effect the boots) but likewise the whole body of a man exhales a peculiar or individual odor, which a dog can recognize as that of his master amid a crowd of other persons; that the individual quality of this odor can be recognized at great distances to windward, or, in calm weather, at great distances in any direction; and that this odor is not overcome by anise seed."—*Zool., Anz.*, No. 242.

MIND AND CONSCIOUSNESS.—*To the Editor of the Open Court*: You and Mr. Hegeler have expressed the desire (in a letter, December 31, 1887), to know how it happened that in my friendly contention with Professor Cope I have used "consciousness" and "mind" synonymously. I did so partly out of courtesy to my adversary, who habitually makes use of the phrase "mind or consciousness," and partly to carry on the discussion as much as possible on the basis given by himself.

Allow me, however, to indicate as briefly as possible how I myself distinguish "consciousness" from "mind." "Consciousness" is that state of our being in which we are aware of what is usually classified as sensations, perceptions, emotions, thoughts and volitions. When we are thoroughly asleep or in a swoon we are not aware of such affections, and are consequently not conscious.

Consciousness, of course, can be only a *present* phenomenon, a manifestation taking place within us *at the very moment*. When we are conscious of something that has occurred in the past, this retrospective consciousness takes place likewise only in the moment of present awareness. The same holds good with prospective consciousness. We foresee the future only as content of our present consciousness.

I have called this one, all-comprising moment of conscious realization "the mental presence," and have repeatedly pointed out that its contents vanish from moment to moment into nothingness, and are as constantly reconstituted under kaleidoscopic changes, from a persistent vital matrix. Con-

sciousness is always the effect or outcome of some underlying *activity*, never itself the manifesting substrate.

The underlying vital matrix is perceived by us as the nerve-system of organic beings. And *all* the functional activities of this nerve-system contribute toward the production of the mental presence, though many phases of it may remain unconscious; and this not only from their not attaining a sufficient degree of intensity, but also by dint of normal disposition (see "Space and Touch," *Mind*, No. XL.).

When the term consciousness is used collectively for a series of mental states which we experience during an hour or a lifetime, it does not denote an actual phenomenon or veritable existent, but stands merely as a general name, in the same way as "animal" or "plant."

The term "mind" signifies to most persons some active immaterial agent within us, capable of producing or manifesting conscious states. As I do not believe in such an agent, I can rightly speak of mind only adjectively, as when I say: "mental states," and then "mental" is really synonymous with "conscious." Or I can speak of it, at most, as an attribute of our being, as when I say, "our mentality," which is not synonymous with our "consciousness," as it includes also the unconscious working of the brain toward the production of consciousness.

We can, moreover, not well avoid using the term "mental" as an opposite to "physical." This distinction is felt by every one to be legitimate. Yet it is incontestable that everything physical—all matter and all motion—is realized by us solely as perception of our own. We become aware of it as a peculiar kind of conscious event within our own mental presence. A physical fact is, consequently, itself of mental consistency, for it forms part of our own consciousness. And the only essential difference between it and other constituents of our consciousness lies in the fact of its being aroused in us through compulsory sense-stimulation, while other conscious states arise in us without any compulsory influence working upon us from outside our own being.

To become, however, fully alive to the radical contrast obtaining between what we call a "physical" and what we call a "mental" fact, we need only realize that mental facts, as such, are entirely imperceptible through sensory channels, while it is the very characteristic of physical facts to be thus perceptible. I can touch your physical being, hear your voice, and

see your body move and gesticulate ; but I cannot touch, hear or see any of your sensations, perceptions, emotions, thoughts or volitions. These are inwardly or retrospectively realized by yourself alone.

The distinction here established is essential. It excludes, first of all, the possibility of our entire being consisting of mind stuff, as believed by Idealists of all shades. And it excludes also the possibility of anything mental being in the remotest degree akin to physical forces, as taught by materialistic thinkers, for no one can deny that we give the name of "force" only to that which is capable of affecting our senses in some way or other, and this is exactly the kind of effect that nothing purely mental can produce.

Yours, very truly,

EDMUND MONTGOMERY.

The Open Court.

GEOGRAPHY AND TRAVEL.

ASIA.—FORMOSA.—Mr. G. Taylor, an Englishman in the Chinese Lighthouse Service, gives in the April issue of the *Proceedings of the Royal Geographical Society* a most interesting account of the natives of Formosa. There was considerable difficulty in establishing a lighthouse at the southern end of the island, among wild natives inimical to Chinese rule, but at last the ground for its erection was fairly bought, and this commencement without bloodshed led to future amicable relations. The Chinamen has ousted the natives from the fertile and highly cultivated plains of the west and north, and even in the south the Chinese squatter has fixed himself upon all the streams, so that the really wild natives have had to retreat to the mountains, especially as many of the native races adopt Chinese customs, settle down, and cultivate the ground.

Formosa possesses only two harbors worthy of the name, viz., Keelong in the north, and Takowin in the west. The first of these can be entered by larger vessels, but the second has the advantage of being more entirely land-locked. The entire island is densely wooded.

There is little doubt that the original settlers were Malay, but physiognomy differs greatly in the same tribe. At present there are four principal races who have preceded the Chinese, viz., the Paiwans, Tipuns, Amias, and Pepohoans.